SoS, DSD and SECO: Relations among these Areas

By Claudia Werner
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Workshop on DSD, SECO and SoS
SoS – Systems of Systems
SoS – Systems of Systems

• General characteristics:
  – Constituent Systems (CSs) operational independence
  – CSs managerial independence
  – CSs geographical distribution
  – SoS evolutionary development
  – SoS emergent behaviors
SoS – Systems of Systems

• Software-intensive System-of-systems refers to a set of organizational, managerial independent constituent systems, mainly coordinated by software systems, and collaborating among them to comply with a comprehensive, new mission in a dynamic context with regard to the environment, the constituents, and even the mission.  

[Nakagawa, 2014]
SoS – Systems of Systems

Application Domains

Quality Attributes

Publication Distribution through Years
SoSI – Systems of Systems Integration
SoS – Systems of Systems

• Some challenges:
  – Adequately deal with SoS software architectures
  – Investigate how to better develop SoS for diverse domains
  – Propose solutions to different types of SoS

What are the fundamental challenges we need to address in the Software Engineering Community?

By Elisa Yumi Nakagawa
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DSD – Distributed Software Development
DSD – Distributed Software Development

• It aims to help companies to:
  – Be closer to local markets
  – Find local talents
  – Speed up development cycle
  – Reduce developments costs

Do we have evidence these expected benefits are being achieved?
DSD – Distributed Software Development

• Challenges:
  – Communication
  – Coordination
  – Collaboration
  – Delays
  – Language barriers
  – Etc...
DSD – Distributed Software Development

• Research challenges:
  – Local cultures and perspectives
  – Language barriers
  – Access to remote sites
  – Budget to remote on-site studies
  – Etc…

By Sabrina Marczak
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SECO – Software Ecosystems

- Software Engineering Challenges
  (BOEHM & SULLIVAN, 2000, BIFFL et al., 2006, CUKIERMAN et al., 2007, WERNER et al., 2009)

*Incorporation of economic and social issues in Software Engineering (SE)*

- An SE sociotechnical view
- Quality of products and services
- Decision making process
- Experience and industry (ecosystems)
- Creation of a earned value
SECO – Software Ecosystems

• An initial trajectory...
  (SANTOS & WERNER, 2011)
SECO – Software Ecosystems

• A software ecosystem is a set of actors functioning as a unit and interacting in a shared market for software and services, based on a common technical platform or market.

  (JANSEN et al., 2009)

• Software ecosystem consists of a set of software solutions that support and automate activities and transactions of actors who are associated with a social or business ecosystem.

  (BOSCH, 2009)
SECO – Software Ecosystems

- Dimensions

- Technical
  - Motivating the platform development and evolution
  - Contributing to the platform establishment

- Transactional
  - Mapping value propositions and realizations

- Social

Engineering & Management of SECOs
SECO – Software Ecosystems

• Challenges

Open Source Ecosystems
Governance
Analysis
Openness
Quality
Software Architecture
PANEL

Impacts of SECO in the Quality of DSD and SoS
SECO and SoS
(Santos et al., 2014b) (Jeronimo Jr and Werner, 2015)

- Big, complex, heterogeneous and distributed systems (independent components)
- Dynamic evolution and reuse
- Social and Business aspects, besides technical
- Coordination, Communication and Collaboration aspects
- SoS platform (stability, security, interoperability and reliability)
SECO and DSD
(Santos et al., 2014a)

- Globalized, large-scale and long-term platform development
- Process alignment
- Outsourcing governance
- Hybrid business model
- Sustainability and Diversity
- Partner selection (collaborators)
- Architecture opening
CPF

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SoS, DSD and ECOS: Relations among these Areas

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